



# **On-Road Heavy-Duty Diesel Vehicles: Engine Software Upgrade**

**February 24, 2003  
Public Workshop**

**California Environmental Protection Agency**

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**Air Resources Board**

# Overview

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- Introduction
- Software Upgrade
- Schedule
- Contact Information

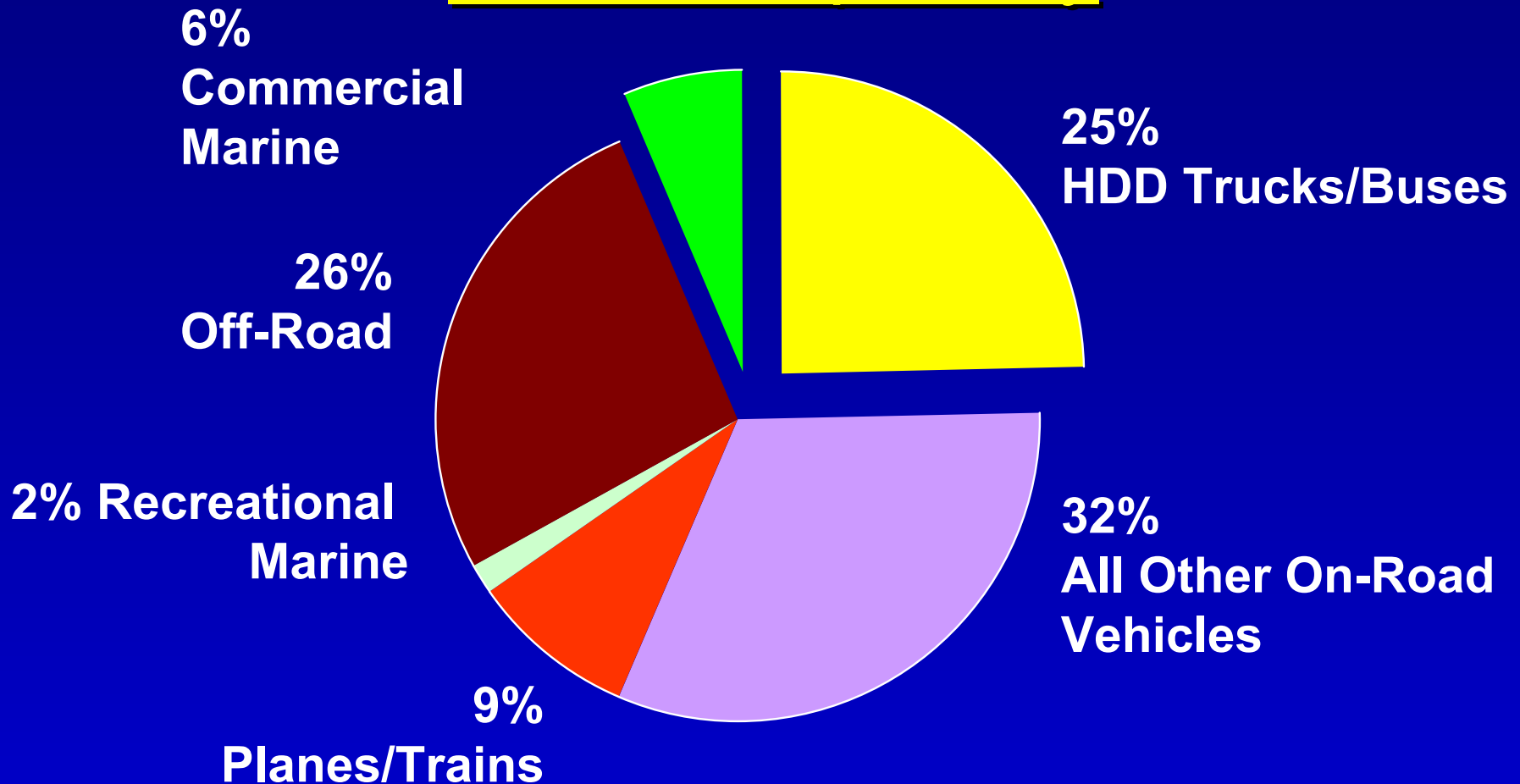
# **ARB's Mobile Source Control Program**

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- **Tightened Heavy-Duty Vehicle Standards**
- **Reduced Motor Vehicle Exhaust Emissions 99 Percent**
- **Mobile Source Control Program moved non-attainment areas closer to federal and State air quality standards**

# Statewide Mobile Source NOx Emissions - 2010

1700 tons per day



# **Why do we need to reduce NOx emissions?**

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- **Endangers Public Health**
- **Loss of Federal Highway Funds**

# Software Upgrade Background

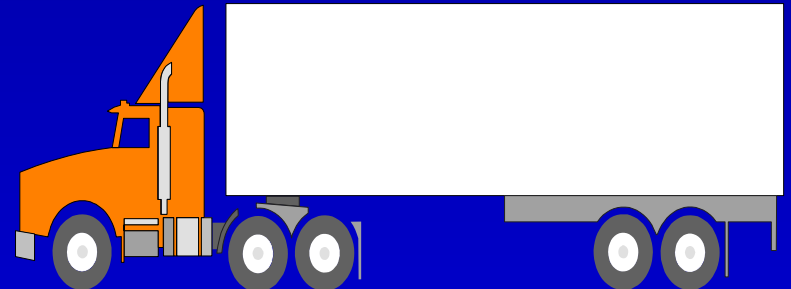
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- Off-cycle NOx Emissions
- Consent Decrees
- Software Upgrade Kits

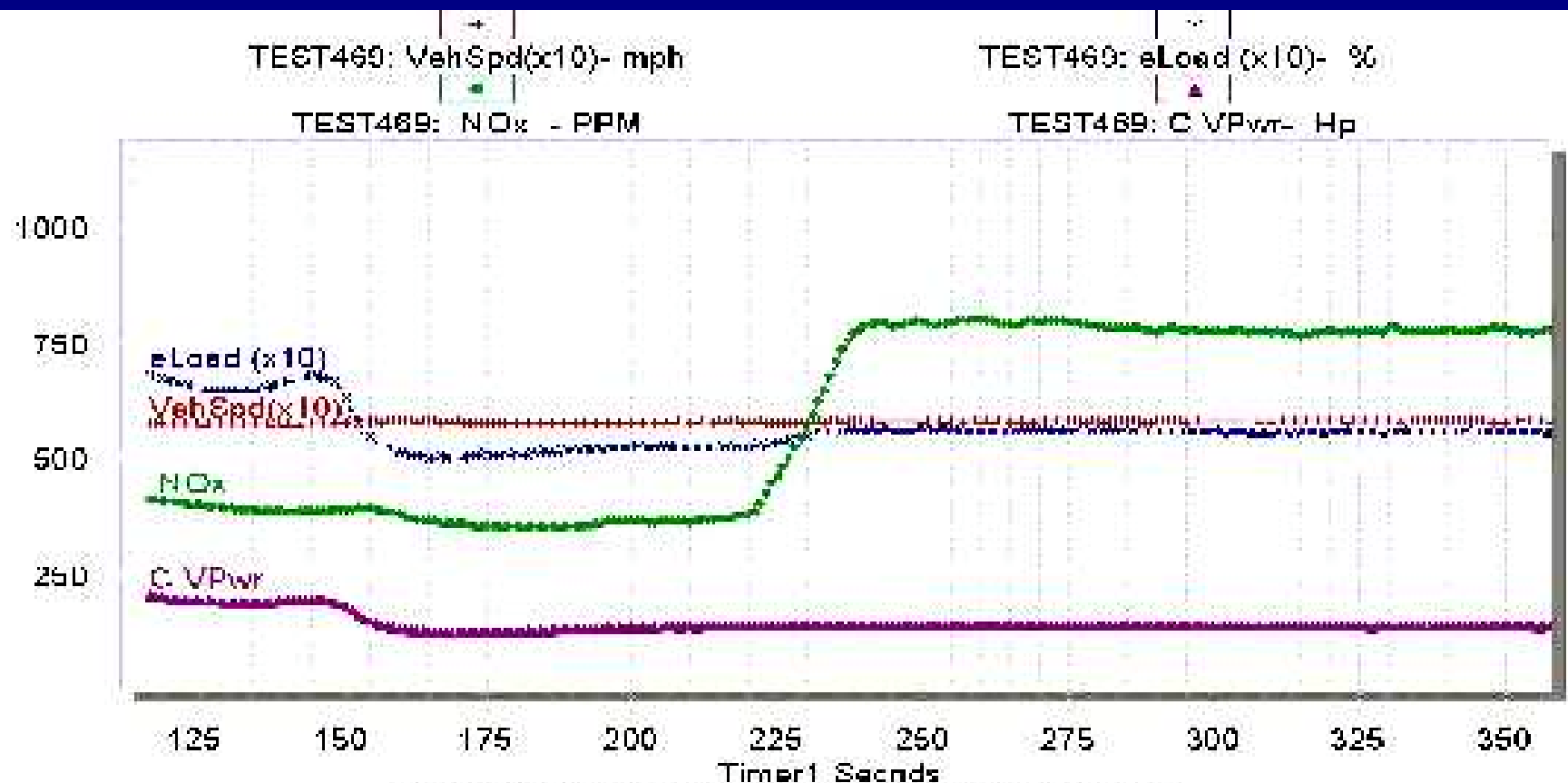
# **Off-cycle NOx Emissions**

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- **Computer-based Strategies**
  - enhanced emissions during certain conditions
  - maximized non-emission goals during other conditions
- **NOx emissions significantly higher than engine certification levels**



# Off-cycle NOx Emissions (cont.)



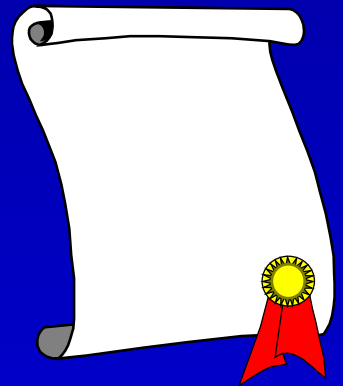
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# Consent Decrees

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- 1998 with U.S. EPA, Dept of Justice, and CARB
- Includes:
  - additional certification requirements
  - software upgrade (low NOx rebuild program)
  - meeting 2004 standards in October 2002
  - in-use testing
  - offset and incentive programs



# **Software Upgrade Kits**

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- **Software Installation**
- **Time Required = 0.5 hour**
- **Low NOx Software Emissions**

# **Software Upgrade Status**

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- **Software upgrade not happening**
- **Four percent installation rate**
- **1993 - 1994 trucks are ten years old**
  - **should be rebuilt and reflashed**
  - **1994 trucks alone comprise 20 percent of 1993 - 1998 fleet**

# **Proposed Software Upgrade Regulation**

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- **Software upgrades developed by OEMs per Consent Decree requirements**
- **Owners of 1993-1998 heavy-duty trucks to get software upgrade installed to reduce off-cycle NOx**
- **Implementation starting 2004 - 2005**
- **Estimated emission reductions:**
  - **31 - 40 tpd NOx in 2005**

# **Proposed Software Upgrade Regulation (cont.)**

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- **Applies to engines that have Low NOx software available**
  - 1993 - 1998 MHDDEs and HHDDEs
- **Implementation may be phased in by model year**

# **Proposed Software Upgrade Regulation (cont.)**

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- **Engine manufacturers to reimburse dealers**
- **Proposing no charge to truck owner for software upgrade**
- **Expense to truck owner is time out of service**
- **Dealers and repair shops to install software upgrade**

# **Software Upgrade Conclusions**

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- **Excess NOx emissions from 96 percent of HDDEs with low NOx software**
- **NOx nonattainment in CA**
- **Possible loss of highway funds**
- **Low NOx software easy and quick to install**
- **Low NOx software reduces NOx emissions**

# **Software Upgrade Schedule**

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- **Kick off workshop February 24, 2003**
- **Industry meetings Spring 2003**
- **Public workshop Summer 2003**
- **Document available to the public  
September 2003**
- **Board hearing scheduled for October  
2003**



# Software Upgrade Contact Information

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- Staff

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(916) 322-6913

- Website

- (<http://www.arb.ca.gov/msprog/hdsoftware/hdsoftware.htm>)

- E-Mail Notification Sign-up

- <http://www.arb.ca.gov/listserv/hdsoftware/hdsoftware.htm>